

The Interconnected Nature of the 21st Century World

Digital natives, digital immigrants

My son, Noah, is what some would call a "digital native," one who has never known a world without instant communication. While the 20-year-old university student may appear to inhabit a bedroom in my house, he actually spends much of his time in another galaxy—out there, in the digital universe of gaming sites, web-conferencing, text messages, BitTorrent, and social networking sites like Facebook.

His father, Travis, on the other hand, is a "digital immigrant," one who is still coming to terms with how to check his cell phone's voice mail and view a digital video on YouTube.

This generational divide has been evident for a while, but only now are we beginning to realize that today's technology is changing the way people absorb information and the way our students think and learn. Some researchers believe that this constant interaction with digital media is causing today's students to begin to think and process information in ways very different from the pre-Internet generation. Current research proposes that, "Different kinds of experiences lead to different brain structures" (Prensky, 2001). Students who have immersed themselves in using digital tools such as video games, e-mail, instant message, and television have physically different brains as a result of the digital stimulation. Social science suggests that the environment and culture in which people are raised influences the way they catalog and process information. This can be clearly seen when examining thinking skills enhanced by repeated exposure to computer games and other virtual media, as thought patterns are less linear and more divergent in style (Prensky, 2001). Today's student also is better at multitasking and responds faster to expected and unexpected stimuli.

Marc Prensky (2001) first coined the term digital native to refer to today's students. "They are native speakers of technology," Prensky says, "fluent in the digital language of computers, video games, and the Internet. I refer to those of us who were not born into the digital world as digital immigrants. We have adopted many aspects of the technology, but like those who learn another language later in life, we retain an 'accent' because we still have one foot in the past." For example, digital immigrants will often choose to read a manual rather than learn from the experience of working with the software program. "Our accent from the predigital world often makes it difficult for us to effectively communicate with our students," Prensky says.

Referring to younger people as "the digital natives" for whom technology use comes more naturally and to older people as "the immigrants" who comprise most of the adult population and teaching cadre in our schools and universities can be helpful in understanding the obstacles that surface when teaching this generation of learners.

The need for an expanded continuum

Educational Consultant Wes Fyrer (2006) feels that, rather than individuals falling into one

camp or the other, there exists a continuum in which people can find their place:

The Natives: Students who have grown up in, or are growing up in, the digital age; who assimilate digital tools and methods for communication as easily as they breathe.

The Immigrants: Older adults in society and in our schools who did not grow up with digital technology tools, but who are working to learn the language and to communicate effectively with the natives around them. Some of the immigrants are open and accepting of native ways, but many are resistant to change.

The Refugees: Older adults in society who have chosen to flee from rather than integrate into the native culture. They may actively work against the goals and interests of both the digital natives and the digital immigrants. The refugees are primarily motivated by fear and a staunch desire not only to resist change but to actively oppose it, to deny the existence of a changed environment, and/or to ignore it.

The Bridges: The digital bridges are neither truly natives nor fully digital immigrants. Like millennials, who have one foot in each century, the bridges have both native and immigrant traits. As a result, digital bridges are able to communicate relatively effectively with both groups.

The Undecided: These people have not made up their minds about which group they fit into, or which group they want to fit into. They are likely immigrants or refugees, but may not have taken sufficient action to reveal their identities and/or preferences for group identity.

But does this oversimplification give teachers an excuse to not master these pervasive tools as a means for engaging the students they teach? David Warlick blogs about digital natives and digital immigrants and warns educators not to let our immigrant condition limit us as we move forward in learning how to speak in a digital tongue our students will understand.

But I believe that it is time that we stop hiding behind our immigrant status and start acting like natives. We need to stop making excuses and start leading. We are teachers, after all. It's our job to lead, not follow. Sure, we'll never be able to keep up with our kids in lots of ways. They have the luxury of time, and their brain cells are fresher. But it is our job to look into the future and then to plan and lead the way for our children? (Warlick, 2006).

Christopher Dede, Timothy E. Wirth Professor in Learning Technologies at Harvard Graduate School of Education, argues that using these labels can lead to overgeneralizations: Don't start with the technology, when you start with technology, it's a solution looking for a problem. Dede starts, instead, with learning styles. No matter what age you are, your learning style can be shaped by the kind of media you use. Dede suggests that age may not be the determining factor of how seamlessly we use the tools of the 21st Century. For example, those who have a media-based learning style synthesize and process experiences rather than information, regardless of their age. They learn best when taught actively, through collaborations both online and in the real world.

Last generation

The rapid changes taking place in this digital world are just beginning. One of the clear indicators of natives and immigrants will not simply be a question of age, but rather of the instinctive acceptance of rapid technological change. We may very well be the last generation of educators who has the prerogative of deciding whether or not to develop a digital literacy. Many of us have chosen not to acquire proficient technology skills, yet we have still experienced success in our professions. However, the children we teach today do not have that choice. Students must acquire a high degree of digital literacy to be truly marketable in the 21st Century. As educators, we do our students a great service if we allow them to seamlessly garner these skills within the safety nets of our classrooms. This means educators will need to immerse themselves in the digital landscape to be able to design learning activities that will be meaningful and authentic to this generation of learners (Nussbaum-Beach, 2003).

Digital students: Who are they and how do they learn?

According to Diana and James Oblinger (2005), today's students learn differently than previous generations and, as a result, they feel disconnected from schools that were designed for another time. Most of today's students have grown up in an environment where they control the flow of information they receive and the graphic format in which they receive it. Think about it: almost everywhere they go, this media-rich generation finds a constant stream of multimedia competing for their attention. They take in the world via cell phones, handheld gaming devices, portable digital assistants (PDAs), and laptops that they take everywhere. They are truly mobile. And at home they mainline electronic media in the form of computers, TV, and collaborative video games they play with users they have never met from around the world. Everywhere they go in society, technology beckons. The future is rushing at them full speed, until they enter our classrooms and time seems to stand still. Children today spend much of their day learning in the same way their grandparents did and, as a result, school seems rigid, uninteresting, and unyielding to many students (Nussbaum-Beach, 2003).

Digital disconnect

Today's multitasking students are better equipped for change than many of their teachers. In fact, researchers Ian Jukes and Anita Dosaj refer to this disconnect as the result of poor communication between "digital natives" (today's students) and "digital immigrants" (many adults). These parents and educators, the digital immigrants, speak DSL, digital as a second language (Jukes and Dosaj, 2003). Look at the differences between how digital students learn and how analog teachers teach.

The differences between digital native learners and digital immigrant teachers.

Digital Native Learners	Digital Immigrant Teachers
Prefer receiving information quickly from multiple multimedia sources.	Prefer slow and controlled release of information from limited sources.

*Ian Jukes and Anita Dosaj, The InfoSavvy Group, February 2003

Prefer parallel processing and multitasking.	Prefer singular processing and single or limited tasking.
Prefer processing pictures, sounds, and video before text.	Prefer to provide text before pictures, sounds, and video.
Prefer random access to hyperlinked multimedia information.	Prefer to provide information linearly, logically, and sequentially.
Prefer to interact/network simultaneously with many others.	Prefer students to work independently rather than network and interact.
Prefer to learn "just-in-time."	Prefer to teach "just-in-case" (it's on the exam).
Prefer instant gratification and instant rewards.	Prefer deferred gratification and deferred rewards.
Prefer learning that is relevant, instantly useful, and fun.	Prefer to teach to the curriculum guide and standardized tests.

Students are coming into our classrooms ready to learn in digital ways that are familiar to them and instead, they are just sitting there with pencil and paper in hand not engaged and not learning. The disconnect between how students learn and how teachers teach is easy to understand when one considers that the current school system was designed for preparing students for working in factories and agriculture. However, the world has changed and continues to change at an ever-increasing rate. While schools have done a masterful job of preparing students for an industrial age, we are moving at warp speed into a whole new era! Some believe the future of our educational system will hinge on our ability to lead and adapt, as we prepare our students for the future. We are the first generation of teachers who are preparing students for jobs that haven't even been invented yet. This means educators will need to rethink not only what to teach, but what it means to teach and learn in the 21st Century. Schools must be willing to redesign themselves or render themselves irrelevant in preparing students for success in the 21st Century.

Literacy in the 21st Century

Being literate in the future will certainly involve the ability to read, write, and do basic math. However, the concept of literacy in the 21st Century will be far richer and more comprehensive than the education you and I received growing up (Warlick, 2003). The very nature of information is changing: how we organize it where we find it, what we use to view it, what we do with it, and how we communicate it. Will Richardson (2006) ? in his book *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms* ? talks about the transformational nature of these pervasive technology tools, especially in terms of their ability to nurture connections and collaborations: ?Whether it?s blogs or wikis or RSS, all roads now point to a Web where little is done in isolation and all things are collaborative and social in nature.? The most prevalent change in how we use the Internet in the 21st Century is not as much in the ability to publish information as it is the ability to share and connect with others from around the globe.

The social web: Learning together

Today's read/write web technologies have the power to create informal peer-to-peer social connections and to open new avenues for learning environments that go beyond those that are linear, teacher-centered, and lecture-based to ones that are divergent, dynamic, student-centered, constructive, and communication-rich.

A passionate student is a learning student. As the people of the world are becoming increasingly connected, the nature, use, ownership, and purpose of knowledge are changing in profound ways. Our goal as educators is to leverage these connections and changes as a powerful means to improve teaching and learning in our schools. We have a changing demographic in our classrooms, and by networking together with individuals from around the world we are building capacity in our students and ourselves to understand multiple viewpoints and perspectives. And by using digital media and web-based tools, students can build their own learning experiences, construct meaning, and collaborate in teams to solve authentic content-based problems. Many teachers who use these empowering technologies are now discovering we can have rigor without sacrificing excitement. The secret: focus on student passion and interest, not machines and software. Today's digital natives are passionate about team-based learning approaches because of their vast digital gaming experiences. It feels natural for them to learn by collaborating online with others they have never met.

Developing an effective learning environment in the 21st Century requires drawing on a wide range of teaching concepts, methods, strategies, and technologies. For example, building a rich environment for inquiry involves an understanding of literacy, of problem- and project-based learning, of critical and creative thinking skills, of problem solving techniques and constructivist learning theory. Allowing students to work in teams both in the classroom and with others around the world ensures that students are engaged in activities that help them actively pose questions, investigate and solve problems, and draw conclusions about the world around them. Author and researcher Daniel Goleman (1996) suggests that working in teams enables students to practice needed life skills. Requiring students to learn socially actually forces students to draw on their emotional intelligence. This is a set of skills that includes how one handles emotions, deals with frustration, or resolves conflict. Through our creative use of the vast array of web-based social networking tools available, our students become researchers, writers, videographers, and activists rather than passive receivers of a textbook's content. They still learn content but through an authentic means that will prepare them for the world of work of tomorrow, rather than the world of work of today or yesterday. Collaboration is the focus of that learning.

References

Fryer, W. (Friday, October 20, 2006). *Digital refugees and bridges*. Retrieved December 31, 2006 from <http://www.infinitehinking.org/2006/10/digital-refugees-and-bridges.html>

Goleman, D. (1996). *Emotional intelligence: Why it can matter more than IQ*. London: Bloomsbury.

Jukes, I., Dosaj, A., & Macdonald, B. (2001). *NetSavvy: Building Information literacy in the classroom*.

California: Corwin.

Jukes, I & Dosaj, A. (February, 2003). The InfoSavvy Group. Excerpts from Apple's *Digital tools for digital students* website: apple.com/education/digital.

Oblinger, D. and Oblinger, J. (2005). *Educating the net gen*. Retrieved January 5, 2007 from <http://www.educause.edu/books/educatingthenetgen/5989>

Prensky, M. (2001a). *Digital natives, digital immigrants*. Retrieved January 5, 2007 from <http://www.marcprensky.com/writing/default.asp>

Pruitt, C. (May 5, 2005). *The next decade of educational media*. An interview with Christopher Dede. Retrieved January 5, 2007 from <http://www.digitaldivide.net/articles/view.php?ArticleID=372>

Nussbaum-Beach, S. (2003). *The last generation*. A Tapestry of Knowledge, Volume III. Virginia: Letton Gooch.

Richardson, W. (2006). *Blogs, wikis, podcasts and other powerful web tools for classrooms*. California: Corwin.

Warlick, D. (2004). *Redefining literacy for the 21st Century*. Ohio: Linworth.

Warlick, D. (February 15, 2006). *Act like a native*. Retrieved December 31, 2006 from <http://davidwarlick.com/2cents/2006/02/15/act-like-a-native/>

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